

## 199-N-42 (A4690) Log Data Report

### Borehole Information:

<b>Borehole:</b> 199-N-42 (A4690)		<b>Site:</b> 100-NR-2			
<b>Coordinates (WA St Plane)</b>		<b>GWL<sup>1</sup> (ft):</b> 69.3		<b>GWL Date:</b> 04/27/06	
<b>North</b> 149906.82 m	<b>East</b> 572265.62 m	<b>Drill Date</b> 04/84	<b>Elevation (TOC)</b> Not available	<b>Total Depth (ft)</b> 78	<b>Type</b> Cable

### Casing Information:

<b>Casing Type</b>	<b>Stickup (ft)</b>	<b>Outer Diameter (in.)</b>	<b>Inside Diameter (in.)</b>	<b>Thickness (in.)</b>	<b>Top (ft)</b>	<b>Bottom (ft)</b>
Welded steel	2.8	8 5/8	8	5/16	2.8	53
Screen	None	5 1/2	4.875	0.22	53	78

### Borehole Notes:

Casing diameter and stickup measurements for the 8-in. casing were acquired using a caliper and steel tape. Measurements are rounded to the nearest 1/16 inch. The screen data are for typical stainless steel screens used at Hanford. The top of screen depth is assumed on the basis of the swab and e-tape both "catching" at a 53 ft depth. Logging data acquisition is referenced to the top of casing (TOC).

### Spectral Gamma Logging System (SGLS) Equipment Information:

<b>Logging System:</b> Gamma 1N		<b>Type:</b> SGLS (60%) SN: 45TP22010A	
<b>Effective Calibration Date:</b> 04/05/06	<b>Calibration Reference:</b> DOE/EM-GJ1183-2006		
	<b>Logging Procedure:</b> MAC-HGLP 1.6.5, Rev. 0		

### Neutron Moisture Logging System (NMLS) Equipment Information:

<b>Logging System:</b> Gamma 4H		<b>Type:</b> SGLS SN: H310700352	
<b>Effective Calibration Date:</b> 03/06/06		<b>Calibration Reference:</b> DOE/EM-GJ1154-2006	
		<b>Logging Procedure:</b> MAC-HGLP 1.6.5, Rev. 0	

### Spectral Gamma Logging System (SGLS) Log Run Information:

<b>Log Run</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5 Repeat</b>
Date	04/27/06	04/28/06	04/28/06	05/01/06	05/01/06
Logging Engineer	Spatz	Spatz	Spatz	Spatz	Spatz
Start Depth (ft)	38.0	69.0	53.0	49.0	68.0
Finish Depth (ft)	3.0	52.0	48.0	37.0	58.0

Log Run	1	2	3	4	5 Repeat
Count Time (sec)	200	200	200	200	200
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	0.5	0.5	0.5	0.5	0.5
ft/min	N/A <sup>2</sup>	N/A	N/A	N/A	N/A
Pre-Verification	AN017CAB	AN018CAB	AN018CAB	AN019CAB	AN019CAB
Start File	AN017000	AN018000	AN018035	AN019000	AN019025
Finish File	AN017070	AN018034	AN018045	AN019024	AN019045
Post-Verification	AN017CAA	AN017CAA	AN018CAA	AN019CAA	AN019CAA
Depth Return Error (in.)	- 0.5	0	- 0.5	0	0
Comments	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment

### **Neutron Moisture Logging System (NMLS) Log Run Information:**

Log Run	6 Repeat	7	8		
Date	05/03/06	05/04/06	05/04/06		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	52.0	3.0	52.0		
Finish Depth (ft)	62.0	53.0	69.0		
Count Time (sec)	15	15	15		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	0.25	0.25	0.25		
ft/min	N/A	N/A	N/A		
Pre-Verification	DH032CAB	DH042CAB	DH042CAB		
Start File	DH032000	DH042000	DH042201		
Finish File	DH032040	DH042200	DH042269		
Post-Verification	DH032CAA	DH042CAA	DH042CAA		
Depth Return Error (in.)	0	0	0		
Comments	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment		

### **Logging Operation Notes:**

Logging was conducted with a centralizer on each sonde. Below 52 ft the centralizer was not used because the inside diameter of screen was less than 5-in. Measurements are referenced to the top of casing. Repeat sections were acquired in this borehole to evaluate the logging systems' performance.

Neutron moisture measurements with logging system 4F were acquired May 3. The tool failed during logging and logging system 4H was utilized to complete data acquisition for moisture.

### **Analysis Notes:**

<b>Analyst:</b>	Henwood	<b>Date:</b>	07/03/06	<b>Reference:</b>	GJO-HGLP 1.6.3, Rev. 0
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Pre-run and post-run verifications for the logging systems were performed before and after each day's data acquisition. Acceptance criteria were met.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet templates identified as G1NApr06.xls and G4Hmar06.xls for the SGLS and NMLS, respectively. A casing correction

for 0.3125-in.-thick casing was applied to the SGLS data to 53 ft. Below 53 ft a correction for 0.22-in thick casing was applied. No corrections for dead time or water were required.

The NMLS data are not converted to percent moisture due to the lack of calibration data for the non-standard borehole size below 53 ft; the data are reported in counts per second.

### **Results and Interpretations:**

<sup>137</sup>Cs was detected at a few depth locations near its MDL of approximately 0.2 pCi/g.

<sup>60</sup>Co was detected at a few sporadic depth locations and continuously between 59 and 69 ft. The maximum concentration was approximately 0.5 pCi/g at 65.5 ft.

Depth to water was reported at 58 ft in April 1984, and is currently at approximately 69 ft. It appears the groundwater may have been contaminated and a residual amount of <sup>60</sup>Co remains. This <sup>60</sup>Co contamination could be adsorbed onto the casing or sandpack, leaving a “bathtub ring” as the groundwater level receded.

The repeat sections for the SGLS indicate good agreement for the naturally occurring and man-made radionuclides. The repeat section for neutron moisture also showed good agreement.

### **List of Plots:**

Man-Made Radionuclides  
Natural Gamma Logs  
Combination Plot  
Total Gamma and Moisture  
Total Gamma and Dead Time  
Repeat Section of Man-Made Radionuclides  
Moisture Repeat Section  
Repeat Section of Natural Gamma Logs

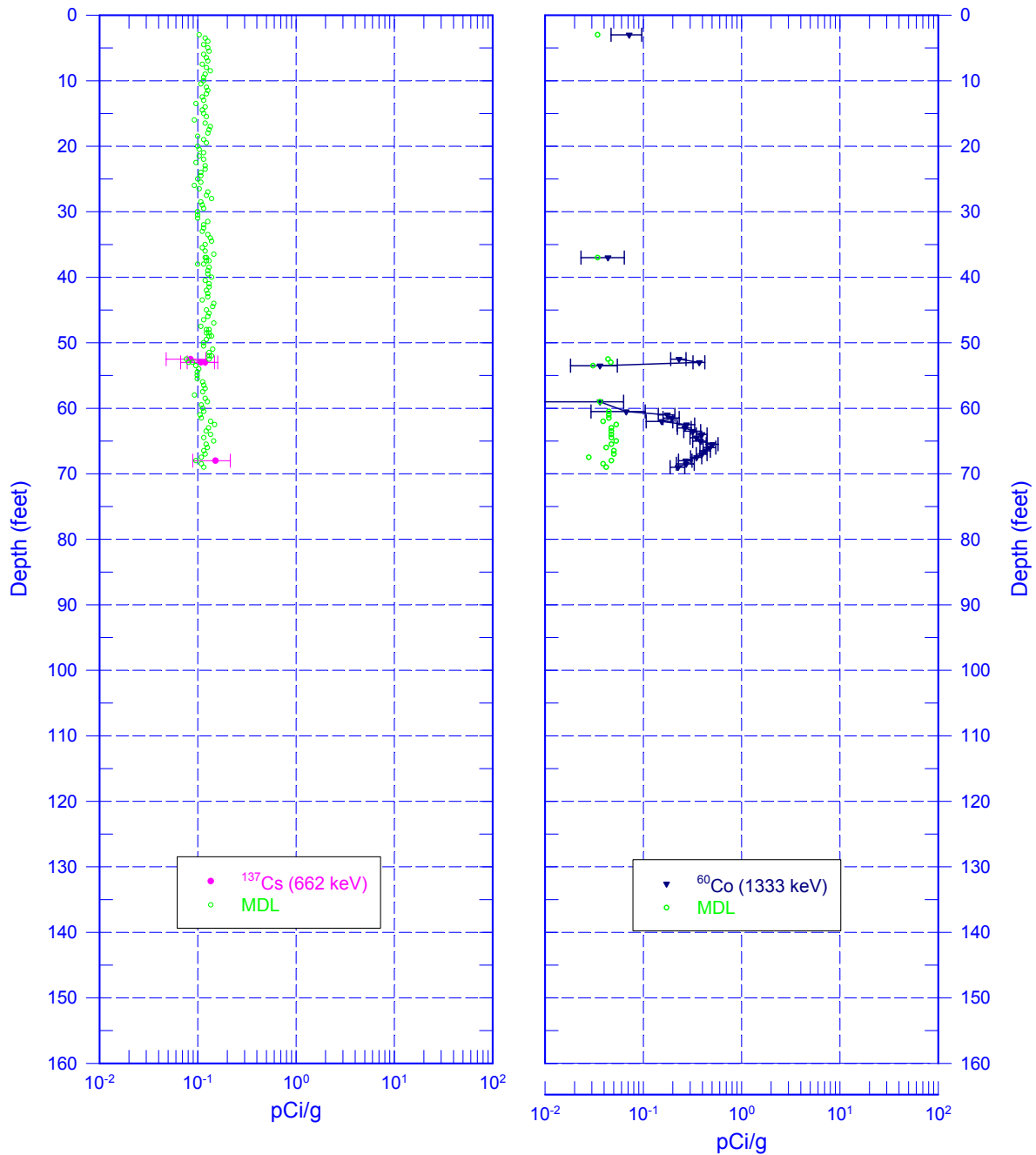
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<sup>1</sup> GWL – groundwater level

<sup>2</sup> N/A – not applicable

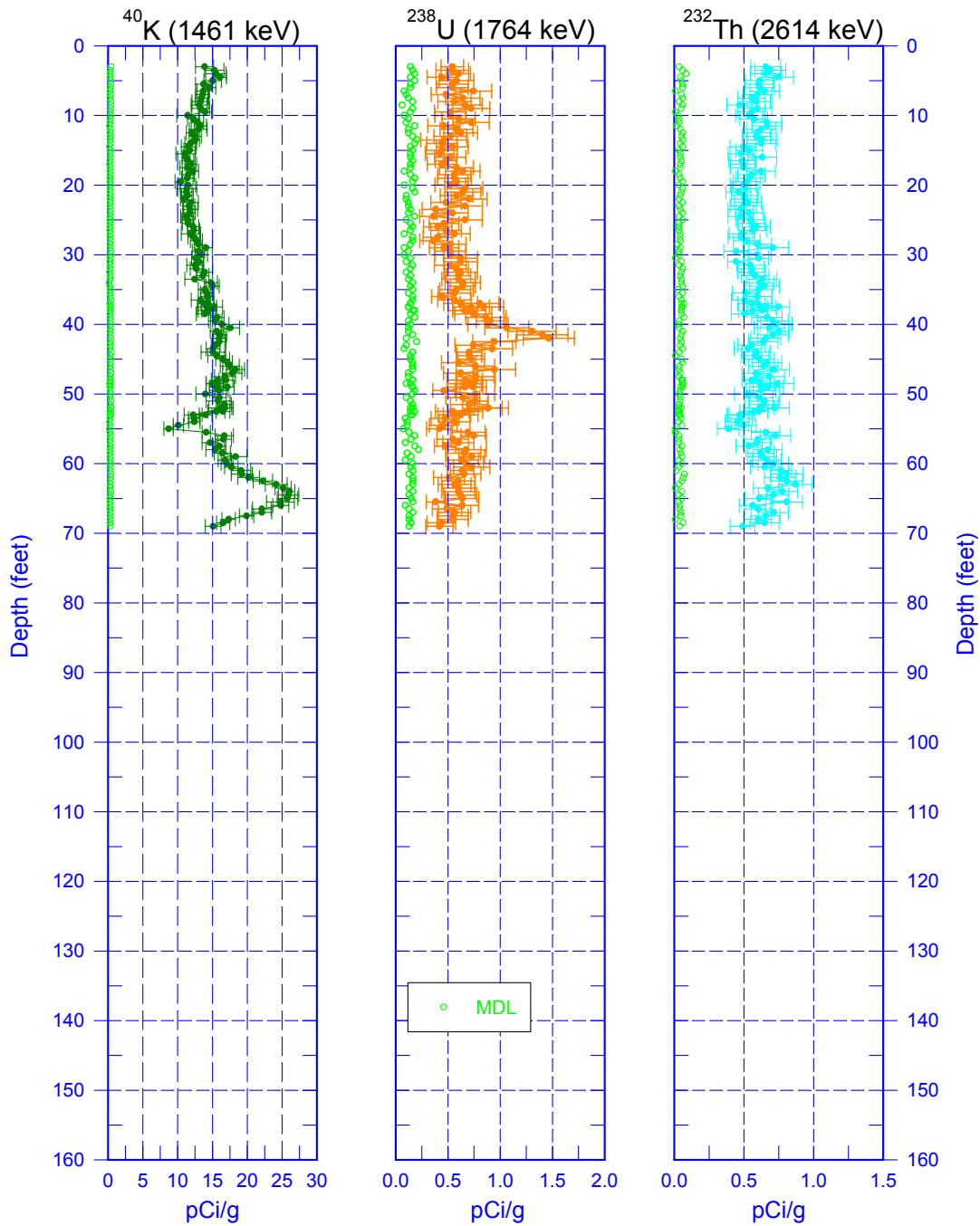
# 199-N-42 (A4690)

## Man-Made Radionuclides



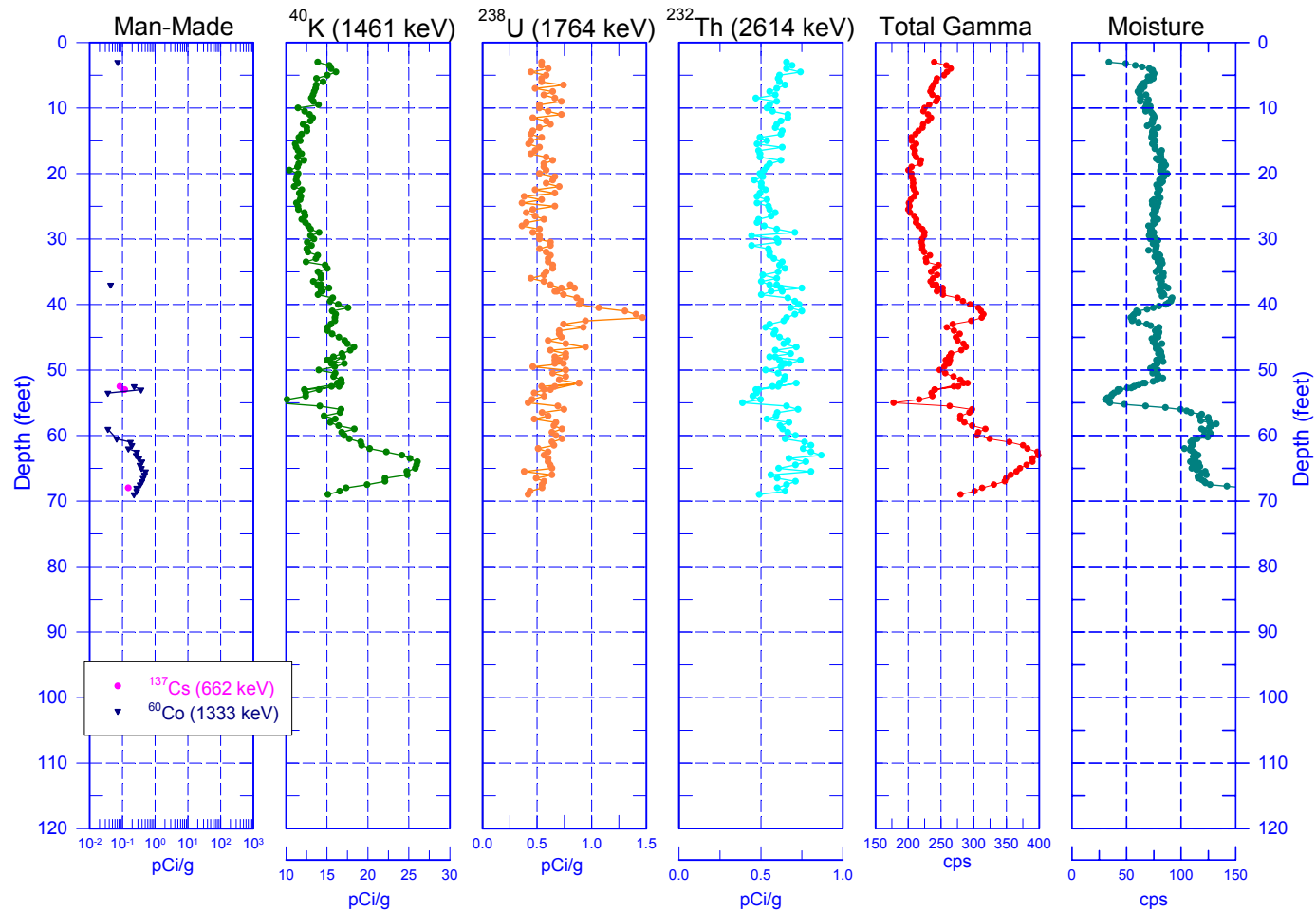
Zero Reference = Top of Casing

# 199-N-42 (A4690) Natural Gamma Logs

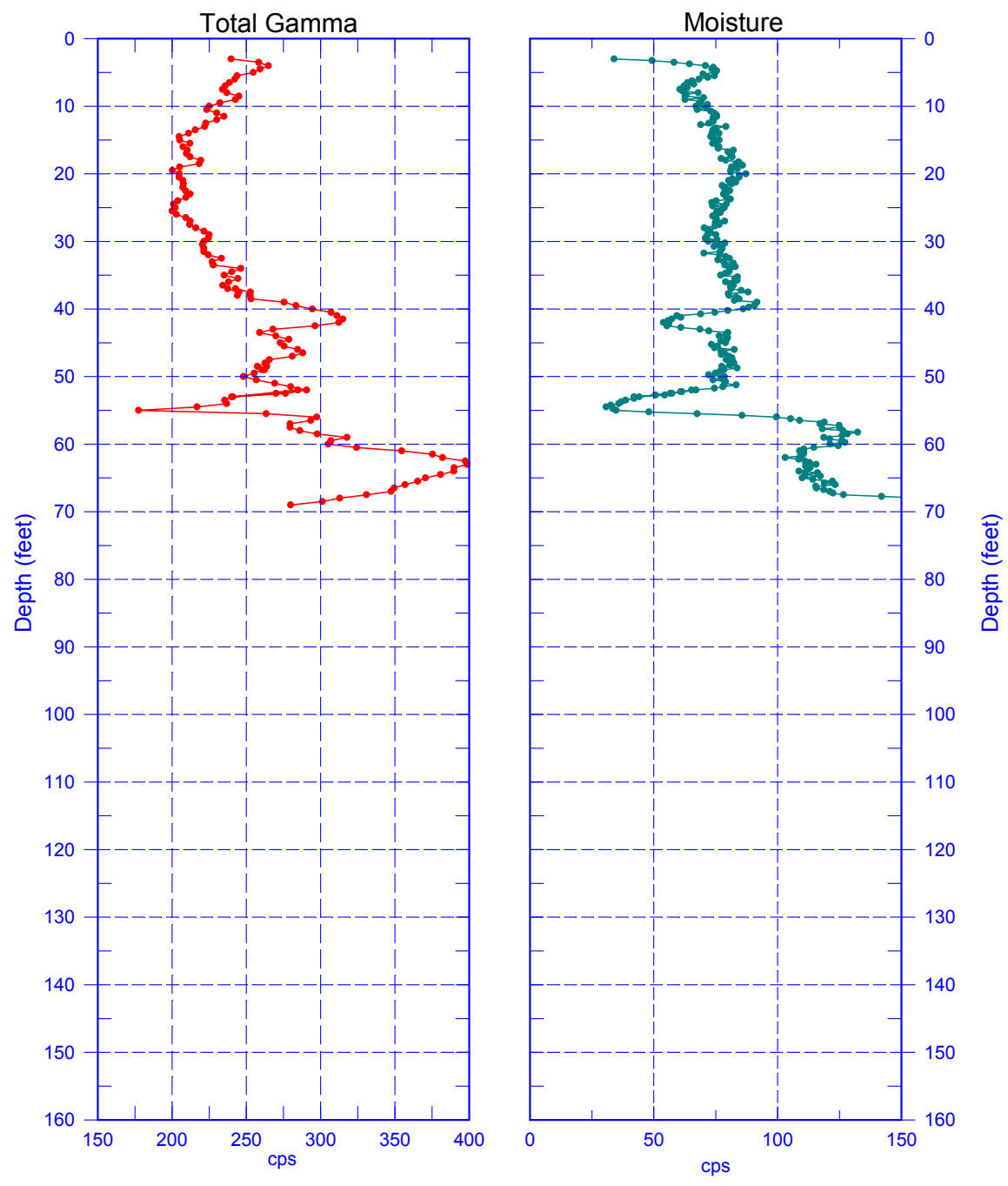


Zero Reference = Top of Casing

# 199-N-42 (A4690) Combination Plot



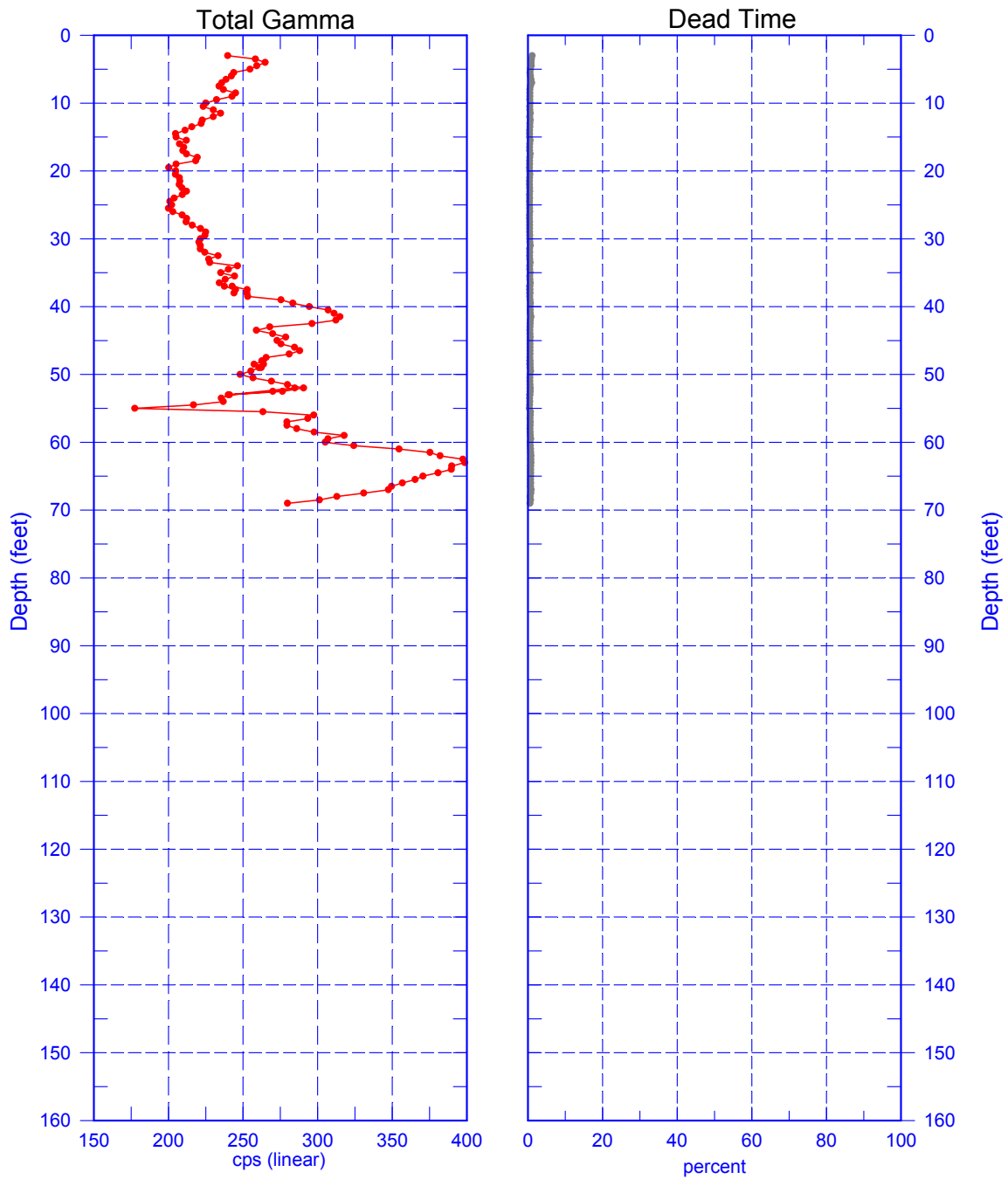
**199-N-42 (A4690)**  
**Total Gamma & Moisture**



Reference - Top of Casing

# 199-N-42 (A4690)

## Total Gamma & Dead Time

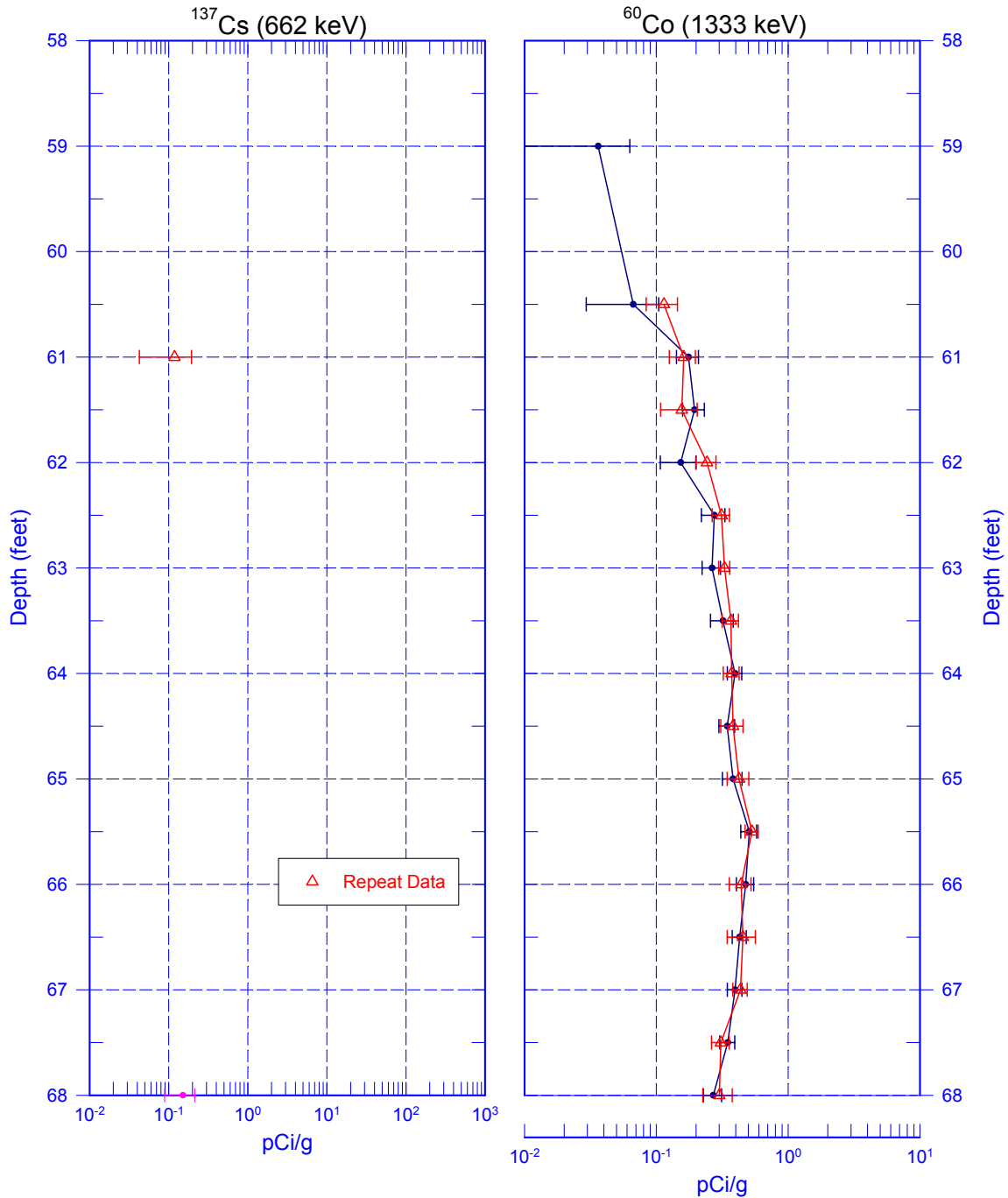


Reference - Top of Casing

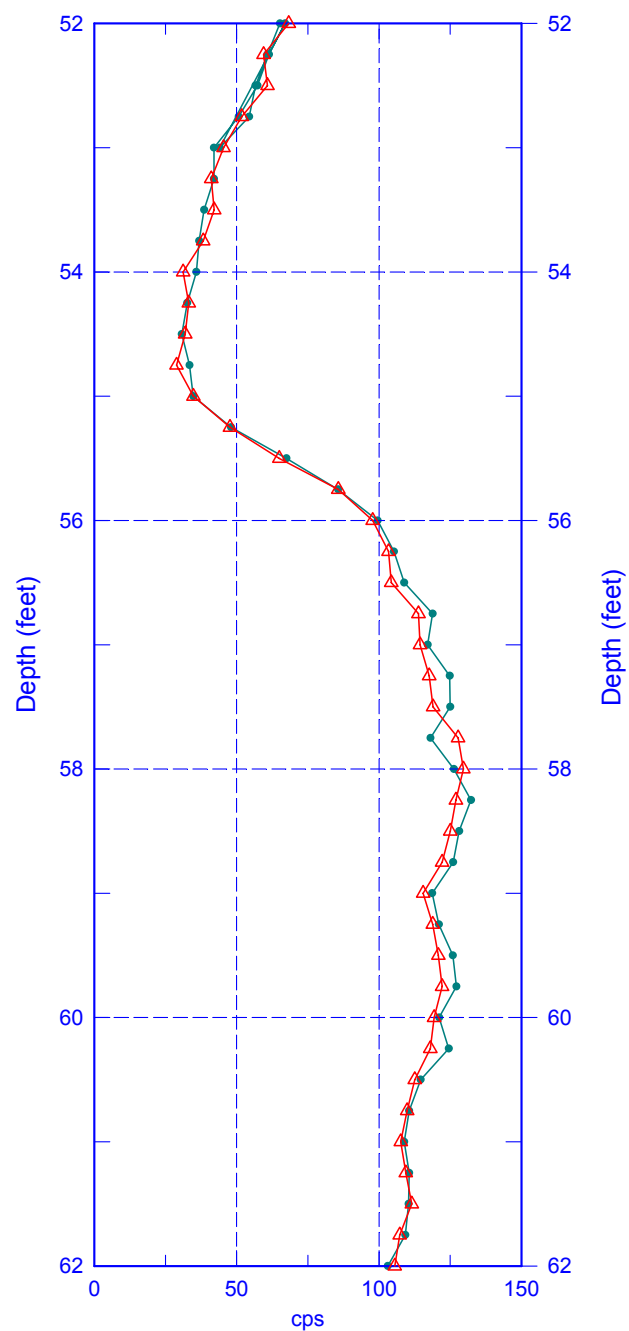


# 199-N-42 (A4690)

## Repeat Section of Man-Made Radionuclides



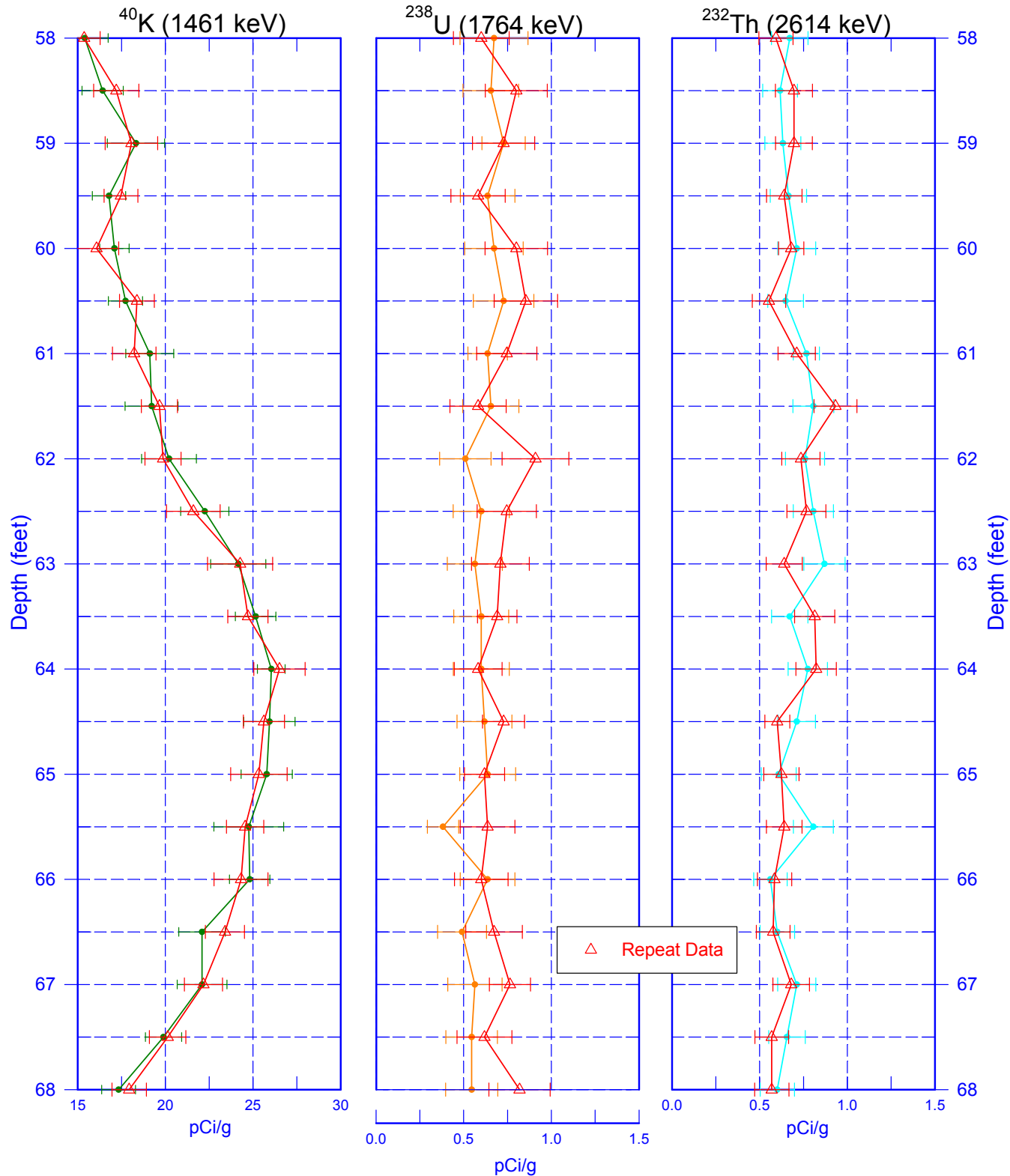
**199-N-42 (A4690)**  
**Moisture Repeat Section**



Reference - Top of Casing

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## Repeat Section of Natural Gamma Logs



Zero Reference = Top of Casing